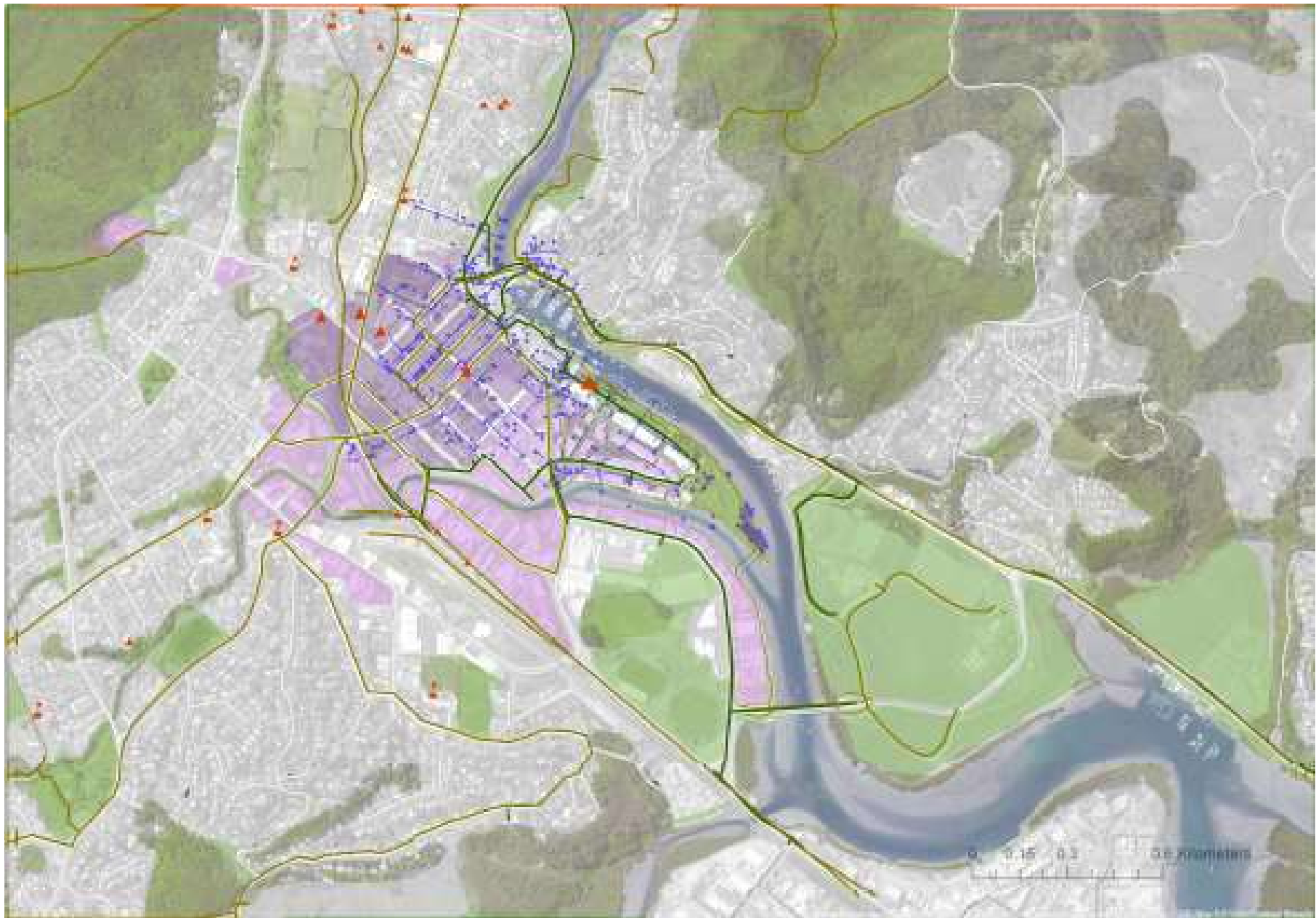


SITE SYNTHESIS ANALYSIS



OPPORTUNITIES & KEYS TO SOLVE THE EXISTING ISSUES

Opportunity 1

To relieve the traffic from getting concentrated in the CBD.



Key 1: Green way (walkway, shared path with cycleways, public bus route, railway)

Opportunity 2

To facilitate infiltration and treatment of stormwater runoff (including stormwater overflows and discharges) that are directly released to Whangarei Harbour.



Key 2: Stormwater inlets (and outlets) to be integrated with (natural) facilities with infiltration and treatment functions.

Issue 3

To restore and enhance ecological connectivity between 'open spaces' that have long been lost by urban rehabilitation.



Key 3:
- Green open spaces to be connected



- Carriageways adjacent to or in proximity to the waterways - to be buffered to adequate widths of riparian corridors

Opportunity 4

To provide opportunities for commercial and economic growth.



Key 4:
- the CBD



- other retail and light industry

- the waterfront residential for quality coastal lifestyle

Issue 5

To support Whangarei and the Hīkiau Precinct as the cultural and educational hub, especially in regards to emphasizing its cultural character.



Key 5:
- Existing schools (including bilingual and Maori schools)



- Historic places

* To be further updated.



#. issues within the area

- waterways contaminated by stormwater discharges
- the areas that are subject to be submerged under the sea in 100 years

#. keys in positioning and designing a wetland

- original geomorphic - the waterway from 1940 that used to flow and smooth the land before having been reclaimed
- where the flood draws a boundary

Hatea River.
Geology - volcanic acidic (rock types: Ng, Ta, Rm, Kt, Mo, Lp, Tp, Ft, La, Sc, Vo, Vu)

Raumanga Stream.
Geology - hard sedimentary (rock types: Ar, Ac, Gw)

Hydrological information.
Climate - warm wet
Source of flow - low elevation (50% rainfall < 400m)
Land cover - urban
Network order - middle order (4)
Valley landform - low gradient (< 0.02%)

Site Synthesis Analysis 1.
Water-sensitive landscape



N

13.9% next dominant wind over winter

W

E

Q. How can we enrich this water-sensitive and perhaps-endangered landscape for people to continue their everyday visit, play, learning, work & living?

#. existin opportunities to drive the design

- places of visitors' interest; place-making
- heritage; of historical significance
- the loop to make the area walker-friendly
- recreational parks and existing vegetation- to utilise the multi-purposeful functions of planting

#. keys in dwelling / workplace orientation

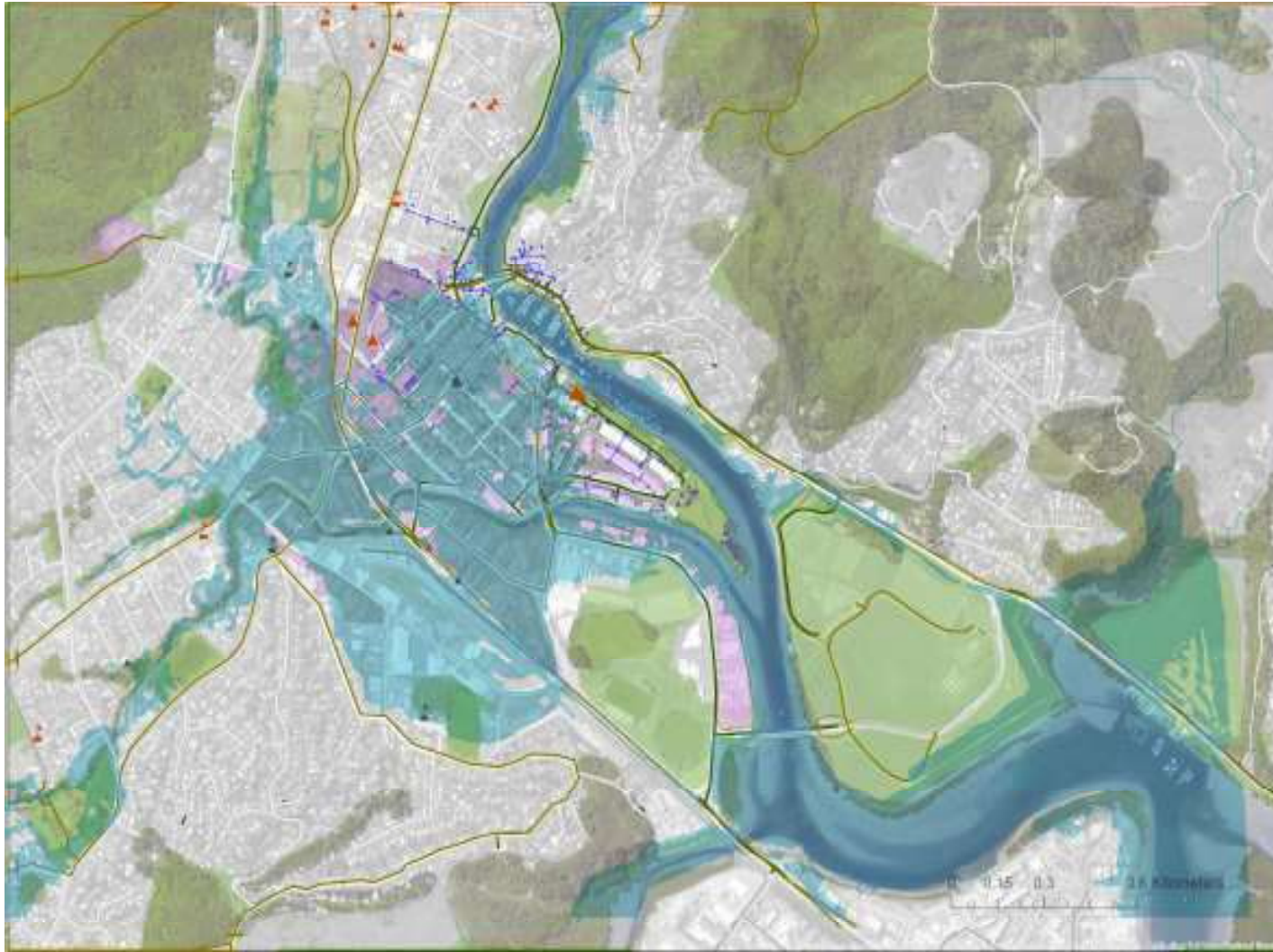
sunlight exposure and wind directions

most dominant South-Westerly wind
21% of all winds; all-year-round

S

Site Synthesis Analysis 2.
A landscape to be sustained
as the everyday destination

MAJOR ISSUE: SEA LEVEL RISE IN 100 YEARS



The Existing * 100 years' flooding zone

Q. Anticipate the effects of existing when they sink under water in 100 years.

Effects in aspects: geogocial / environmental / social / cultural / economic

Q. Can we make solve current ongoing issues while responding to the major issue of sea level rise?



THE PRECINCT PLAN * 100 YEARS' FLOODING ZONE

Issue:

- Limited lifespans for some projects of the Precinct Plan on the areas that are subject to flooding in 100 years
- Neglecting this fact, ongoing development and investment into the plan

Q. What of the Precinct Plan can be retained or ceased from progress?

DEVELOPMENT PROGRAMMES

RESIDENTIAL USE

A medium/high density urban neighbourhood and mix of housing typologies and sizes including town houses, terraced houses, apartments and work/live options.

MIXED USE

Combination or mix of uses within a building and a range of tourist-related activities, community uses, recreation activities and small scale commercial uses that serve the needs of the local community

BUILT FORM

Building heights ranging from two to four (maximum six) storeys. Low-rise town houses, terraced-housing and live/work arrangements typically situated along the Hatea River and Waiarohia Stream. Medium rise (two to four storeys) in the centre of the Precinct comprised of predominately apartments and terraced housing.

OPEN SPACE

A large open space situated on the Peninsula for passive recreation. Well connected Blue/Green Network which provides continuous public access along esplanade of the Hatea River and Waiarohia Stream. Potential for pocket parks and plazas for local residents.

MOVEMENT NETWORK

A publicly accessible foreshore with continuous cycling and walking paths. Walking and cycling network and associated infrastructure. A proposed network of local roads will enhance connectivity within the Precinct. A hierarchy of roads in the Precinct.

COMMUNITY FACILITIES / CATALYST PROJECT

Proposed Hīhīāua Maori Cultural Centre which will include a theatre, conference facility, large display rooms, outdoor courtyards, outdoor stage, Waka carving facility and Waka store amongst other facilities.



'HIHIAUA ZONING', COUNCIL PRECINCT PLAN, N.D

SUB-PRECINCT CONCEPT PLANS

Concept Plans for the four Sub-Precincts were created to describe in more detail what is envisioned. The Sub-Precincts include; the Hatea River Sub-Precinct, Waiarohia Stream Sub-Precinct, Central Hīhīāua Sub-Precinct, and the Reyburn Street Sub-Precinct.

HATEA RIVER SUB-PRECINCT

High amenity residential/mixed use, two storeyed fronting Reyburn House Lane and three storeys (max up to four storeys); fronting Lower Dent Street is envisaged. The Hatea River Sub-Precinct is the most attractive area for residential living and it is anticipated this area will transform/redevelop first.

WAIAROHIA STREAM SUB-PRECINCT

The Waiarohia Stream Sub-Precinct currently has a range of commercial, industrial and professional services such as Ministry offices for Primary Industries and Fisheries, sign writers, automotive services, panel-beaters, accountants and marine related activities. Other activities include a play centre and two lunch bars. There are no residential dwellings currently in the Waiarohia Sub-Precinct.

CENTRAL HĪHĪAUA SUBPRECINCT

Currently, the Central Hīhīāua Sub-Precinct has a range of activities including, retail, small-scale manufacturing, warehousing, car-servicing activities, wholesale trade, storage facilities and other light industrial activities. Many commercial businesses utilise the inner car park for their activities or services for example, Smith and Smith Glass. There are eight residential dwellings located in the Central Hīhīāua Sub-Precinct, located typically on the second

REYBURN STREET SUB-PRECINCT

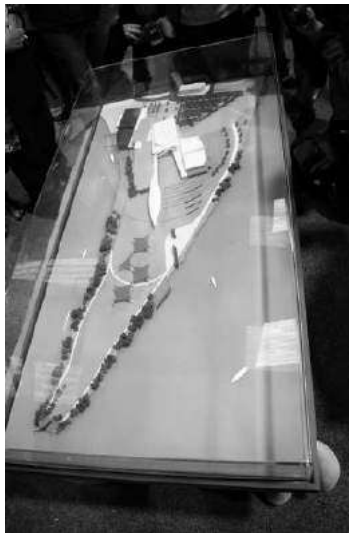
Reyburn Street Sub-Precinct is largely owned by the Northland Regional Council. This Sub-Precinct has a range of uses including a bar, gym, two cafes, printing store, cheerleading gym, car servicing facilities, sail manufacturing activity and wholesaling activities.



'HIHIAUA PRECINCT DESIGN', COUNCIL PRECINCT PLAN, N.D



'PROPOSED CULTURAL CENTRE', HIHIAUA, WHANGAREI, 2017



COMMUNITY FACILITIES/CATALYST PROJECTS

Proposed Hihiaua Cultural Centre

The Hihiaua Cultural Centre is proposed on the Hihiaua Peninsula. The Hihiaua Cultural Centre is envisaged to include a theatre, conference facility, large display rooms, outdoor courtyards, outdoor stage,

Waka carving facility and Waka store, amongst other facilities. A concept drawing of the Cultural Centre is shown in Figure 55. The Cultural Centre is a unique opportunity to foster cultural development and will complement activities in the Town Basin. It will offer a cultural resource and facility for the Whangarei District and the wider region.

CASE | STUDIES



PROJECT FOR NEW YORK'S WATERFRONT

The exhibit organized by MoMA and PS 1 Contemporary Art Centre, cohesive exhibition of 5 projects that engaged in the changes and future of the New York harbour waterfront. Bergdoll divided the harbour into 5 regions that differ in their scales and densities (Cilento, 2010).

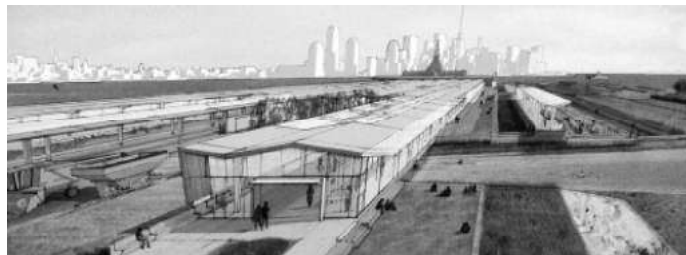


ZONE 0: A NEW URBAN GROUND

The streets of Downtown Manhattan are paved with a mesh of cast concrete and engineered soils and salt tolerant plants. These implementations create greenways that functions like a sponge which absorbs rainwater and surface runoff. The porous green streets control and adhere to daily tidal flows and storm surges with 3 interrelated high performance systems including a network of parks, wetlands and saltmarshes. The implementation of these systems aimed at stopping sewage overflow, block higher sea levels and mitigate storm surge (Cilento, 2010).

ZONE 1: WATER PROVING GROUND

This zone aimed at preventing the disappearance of Liberty State Park, Ellis Island and the Statue of Liberty. This project creates a landscape which is defined by water. The goal of the project was to shift from a hard edge to a soft edge, utilizing the existing landfill and sculpting it into four "fingers" that extended into the harbour. The increased coast-line offers a number of possible varieties for future uses within the area (Cilento, 2010).





ZONE 2: WORKING WATERLINE

This project utilizes the 600 oil tanks to create biofuel from algae fed by wastewater. Land berms were implemented in certain areas to protect while an elevated pathway allows pedestrians and vehicles to use and access the area (Cilento, 2010).



ZONE 4:

The design team proposed to nurture and revitalize the vanishing oyster reef located in the harbour. The reef, in turn, will cleanse millions of gallons of harbour water, protect the adjacent shoreline and reduce the power of storm surges. With the implementation of a number of oyster nurseries, combined with the underwater rope will accommodate to the reefs infrastructure(Cilento, 2010).

ZONE 3: NEW AQUEOUS CITY

A peninsula of man-made islands that stretches along the coast of Staten Island and Brooklyn. These islands were implemented in order to filter storm waves while also creating a space to accommodate expected rise in population (Cilento, 2010).



'PROPOSAL FOR NEW YORK WATERFRONT', 2016

NEW YORK WATER FRONT, USA, 2010

AUCKLAND WATERFRONT



AIM

Auckland, a world class destination that prides our sea-loving pacific culture and maritime history. A place that is commercially successful with a number of thriving innovative businesses that supports the city's growth. The area is rich in character and activities that link people to the sea (Waterfront Auckland, 2013) .

GOALS

- A blue- green waterfront
- A public waterfront
- A smart working waterfront
- A connected waterfront
- A liveable waterfront (Waterfront Auckland, 2013)

TODAY

Aucklands waterfront is currently New Zealand's primary international gateway for commerce and tourism. A region that is rich with maritime history, while also being the largest port and containing highest concentration of marine industry businesses (Panuka Development Auckland, n.d) . It is home to auckland's fishing industry and contains one of the largest marinas in the southern hemisphere (Panuka Development Auckland, n.d).



'AUCKLAND WATERFRONT', AUCKLAND, 2014



TOMORROW

The future waterfront plan has a range of new public spaces and facilities including: the waterfront- wide walkways and cycleways, improved water quality, waterfront transit to britomart, urban boulevard, harbour edge stitch, laneways and many more. As the population grows, Auckland is expected to be home to 2.2- 2.5 million by 2041 (Panuka Development Auckland, n.d). Therefore, over the next 30 years waterfront redevelopment will directly support 20000 new full time jobs in Auckland and will contribute indirectly to a further 20000 jobs across the region, also the waterfront is expected to become a major influencer to the economic growth of Auckland (Waterfront Auckland, 2013).

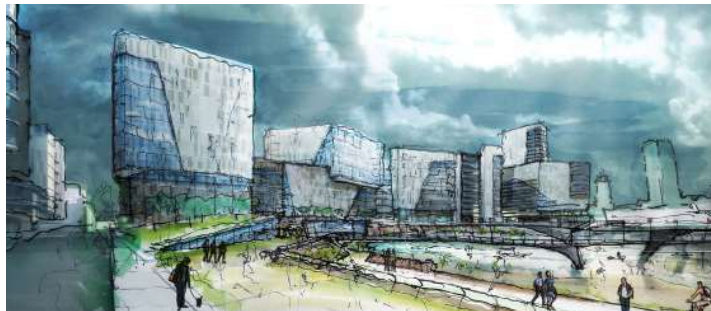
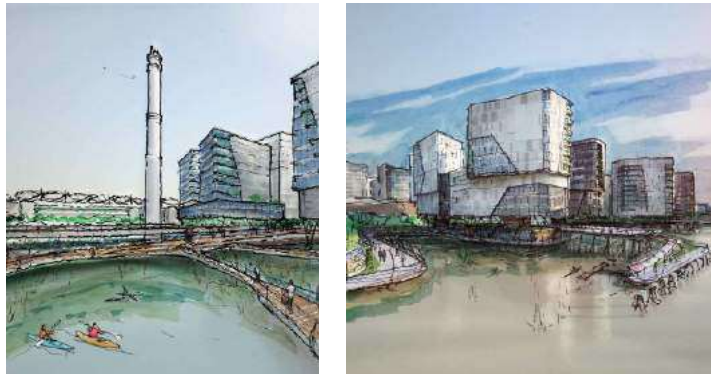


'AUCKLAND WATERFRONT', THINGS TO DO, AUCKLAND, 2017

BOSTON LIVING WITH WATER

"RESILIENT LINKAGES" LED BY NBBJ

50 teams took part in a design challenge to address the effect of climate change by 2100 on one of three Boston sites. Most teams submitted design strategies which embraced the rising sea levels and positioned their effects to offer positive design outcomes within the built environment.



A question is posed "How do you balance immediate pressure for development with the understanding that in the long-term, a site will be subject to regular flooding?" (Boston Living With Water, 2012).

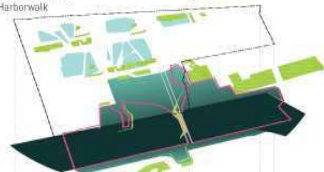
A marriage between the future design and the present site requirements needed to be found within the answer; whether through incremental changes to the site in stages, or a synergetic build that will stand up to the rising tides whilst still being sympathetic to the pre-existing built form.



'BOSTON, LIVING WITH WATER', 2005

WET AND DRY OPEN SPACE

- Stormwater retention ponds
- Saltwater waterparks
- Ground-level open space
- Plaza-level open space
- New Harborwalk



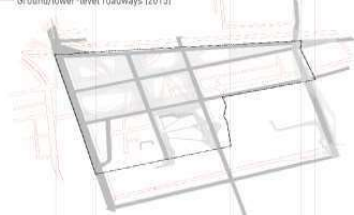
LINKAGE DEVELOPMENT

- Existing buildings
- Future linked development



THE NEW GRID

- Elevated roadways (2100)
- Terraformed landscape
- Pedestrian walkways
- Ground/lower-level roadways (2015)



THE OLD DISTRICT (2015)



The current build form establishes a grid which, with consideration for the growing city, will require integration into any design strategies. Each proposed step will need to keep a cohesive built form so not to lose the "soul" of the district during the periodic construction. The eventual design will aim to elevate the re-existing grid to create a fully functional, adapted, waterfront.

The 100-acre site proposes:

A Vertical Retreat: The ground and street levels will be raised to the rising tide mark. This will ensure they are safe while new levels can be constructed. With rising sea levels these will be given over to the sea (2050-2100); by which time a new level would become the base (the current plaza height).

Phased Transformation: Catalyst builds to feature the plaza level and encourage future development and a transformation of space. The goal is to create a new network to create familiarity before necessity.

The Beaches of Fort Point Channel: The current ground level will eventually be given over to the sea and converted to a waterpark. Further inland stormwater holding areas will be created to minimise the sudden surge of ground water in a high rain flooding event.

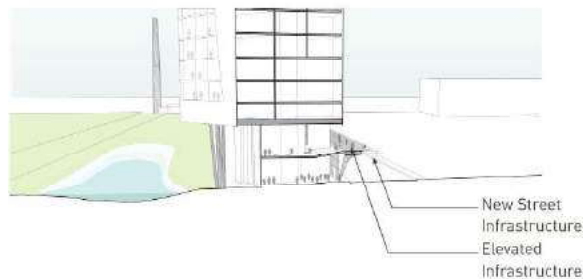
Build the Ark:

Integrate the existing, large footprint building to the proposed grid.

Create coping mechanisms (raised ground floor, barriers, flood channels, etc) for existing architecture. Establish them as "places of refuge" for the extreme weather.

Give these spaces purpose within the current climate; retail, recreation, cafe & restaurant, etc.

Connect the BCEC with South Station: Develop a strategy for a raised connection over the Ft Point Channel.



New Street Infrastructure
Elevated Infrastructure

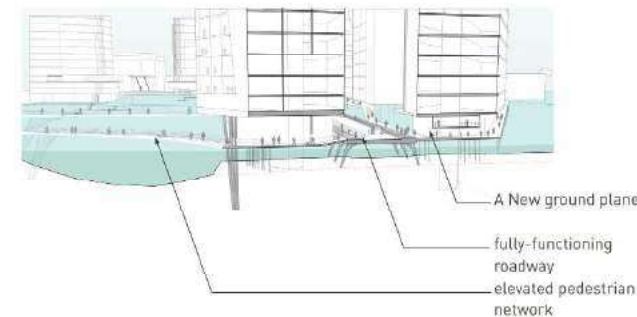
2015 building from the ground up



Wormwood Waterpark

Vertical Retreat Management
new street infrastructure
Elevated infrastructure

2050 begin to elevate uses



A New ground plane
fully-functioning roadway
elevated pedestrian network

2100 yielding the ground plane to water

WETLAND FLOOD CONTROL

Rain falling on the land can do one of four things:

evaporate or be lost to the atmosphere via transpiration from vegetation
collect on the surface in hollows or on vegetation
run over the surface to a water course (overland flow)
infiltrate into the soil and move through it (subsurface flow) (Acreman & Holden, 2013)

The soils in the region have high infiltration rates meaning that more rainfall infiltrates through the soil decreasing the amount of surface runoff. This allows the implemented wetland to hold a large volume of water gradually releasing it into the soil.

With climate change and sea level rise has brought an increase in heavy storms throughout parts of the world. Coastal wetlands are a crucial component in the management and reduction of flooding. Coastal wetlands such as mangroves, saltmarshes and estuaries play an important role in safeguarding human communities from increasing storm surges (Ramsar, n.d).

Floodplain wetlands have been utilized to manage the flood levels in rivers across the world. A notable example is the Charles River in Massachusetts where it has been calculated that the maximum flood levels are extremely low compared to the adjacent Blackstone River due to the fact that it has a smaller wetland. The US Corps of Engineers (1972) calculated that the flood reduction value was 3,800 ha of floodplain storage on the Charles River, saving US\$ 17 million worth of flood damage per year (Doyle, 1987).



'RED RIVER', CORNWALL, NORTH AMERICA, 2009

CASE STUDY

The Red River situated in West Cornwall, North America, drains an region that has been subject to mining and mineral work for a number of years. These human interventions has altered the natural state and water direction due to extensive alterations. The area contains a substantial amount of metalliferous contamination coupled with sedimentation and constant flooding. Within the lower levels of the river, periodic breaching of the embankments occurs resulting in the flooding of the adjacent pastureland. Both the riverbanks and soils located in the area are highly contaminated, especially with arsenic and copper. Therefore when flooding occurs in these areas, toxic contaminates are flushed and scattered across the region causing substantial deterioration to water and land quality. The implementation of a wetland in this area was suggested to help mitigate the contaminates and manage and control flood levels.

THE OBJECTIVES OF THE IMPLEMENTED WETLAND:

- Flood mitigation
- Improve water quality
- Create wildlife habitats and enhance biodiversity
- Recreation/ education

By taking a soft engineering approach, the river can be restored to a more natural cycle and the embanked parts can break down under controlled conditions, preventing the dispersal of metal contaminants. Creating a valuable wetland enhances flood control, water quality and biodiversity (Jenkin, Brown, & Watkins, n.d).

WETLAND DESIGN RATIONALE

The design rationale behind the implementation of a wetland in our design aims around an ecological revitalization of the area. The introduction of the wetland serves multiple functions that benefit the environment and liveability for the community within the area.

WILDLIFE HABITATS:

Firstly the proposed wetland provides an ecological buffer within a busy urban environment. The plants located within the wetland slow down the flow of water allowing particles to settle while also reducing sedimentation. The plants also provide shelter and habitats for native birds and aquatic species enhancing the local ecology (Department of Conservation, n.d). The wetland promotes the Maori concept of Taiao (the protection and restoration of the natural environment) where this offers us an opportunity to revitalize the local biodiversity and allows the community to harvest specific planting species (Auckland Council, n.d).

WATER QUALITY:

The wetland enhances the water and air quality of the area, thus, reducing the effects of the surrounding human environment. Strategically selected plants within the wetland act as filters which are able to decontaminate the soil and cleanse surface runoff from contaminants that originate from the surrounding urban environment (Department of Conservation, n.d). The implementation of the wetland revitalizes the previous waterway that cut through the area, therefore, restoring a natural component that strengthens the ecology of the area. These aspects promote the Maori concept of Mauri Tu (enhancing the quality of air and water while also enhancing the community's well being) (Auckland Council, n.d).

FLOOD CONTROL:

Wetlands are mediums that also reduce the impacts of flooding, as they are able to contain large volumes of rainfall and gradually release water into the surrounding area. Downstream flows and groundwater levels are also controlled during durations of low rainfall and are able to accommodate excess water due to sea level rise. Wetlands are also able to increase the stability of riverbanks and shorelines (Department of Conservation, n.d).

EDUCATION & RECREATION:

Implementing a wetland in the city of whangarei offers recreational opportunities and activities for the community to enjoy. Wetlands accommodate a wide diversity of bird and aquatic species, thus, allowing opportunities such as fishing, bird watching, whitebaiting and hunting to occur. Wetlands also provides a means for students and community members to learn and study the implications and systems of wetlands and how they operate and control contaminants in a dense urban environment (Department of Conservation, n.d).

CULTURAL SIGNIFICANCE OF WETLANDS:

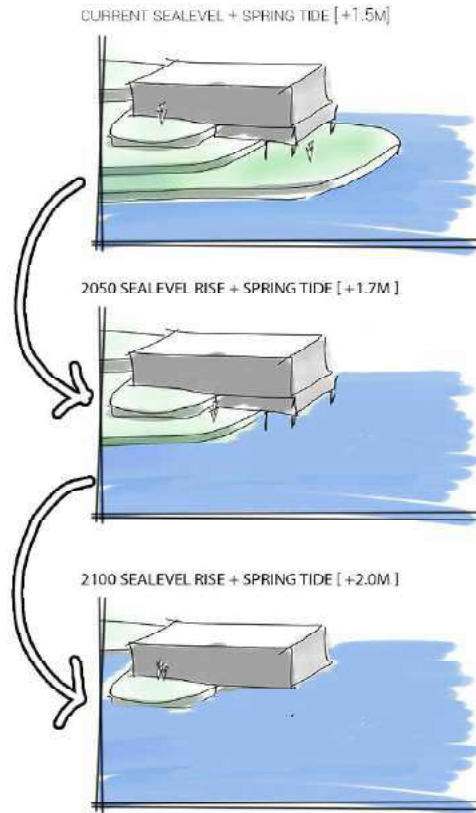
Wetlands, the treasure coves of early Maori, provided a significant means of sustainable cultivation of the land. Phormium tenax, commonly known as harakeke or flax, is a vital component to Maori culture and traditions. The plant was cultivated and used as a form of weaving clothing, mats, kits and ropes. A number of other plants also found in wetlands were used for thatching a means of creating a building roof using dried vegetation (Webster, n.d) and bedding materials (Department of Conservation, n.d). The fauna which lived in the wetland such as eels, fish and birds were a reliable source of food for Maori while also utilizing bird feathers to create garments and cloaks. Wetlands also functioned as a means for early Maori to navigate the area using their waka (canoe), therefore, signifying the cultural importance of waterbodies (Department of Conservation, n.d).



'WETLAND DESIGN', 2006

DESIGN CONCEPTS

-  Establish a connection between The Water and The People
-  All water from the site should be filtered before returning to the river
Water should leave cleaner than it arrived
-  Guide people to the cultural centre through the site
-  Keep a corridor with the CBD that leads into the site
-  Develop a long term strategy [for +20years, for +50years]
-  Allow for flooding in a controlled way
-  Create a learning opportunity for Whangaria's environmental strategy



FIRST CONCEPT

TOO SIMILAR TO THE CURRENT PLAN. DECIDED TO FOCUS ON GREEN SPACE VS URBAN SPACE.

Green Space & Corridors = Design Direction
River (re-establish the stream)
mangroves
no fences
open spaces
shovel gardens/parks
green visible @ all times
teach about environment

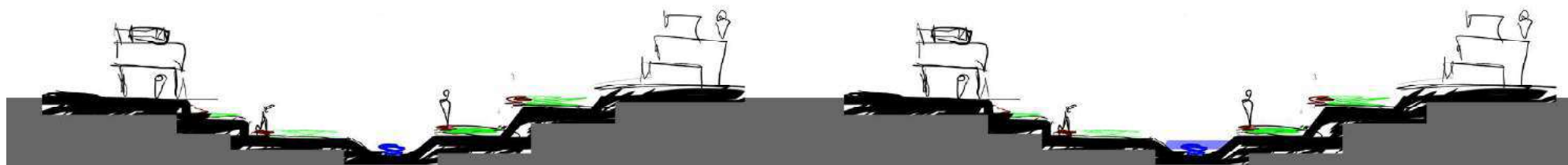
Connectivity — people to place
 — people to each other
 — to green spaces

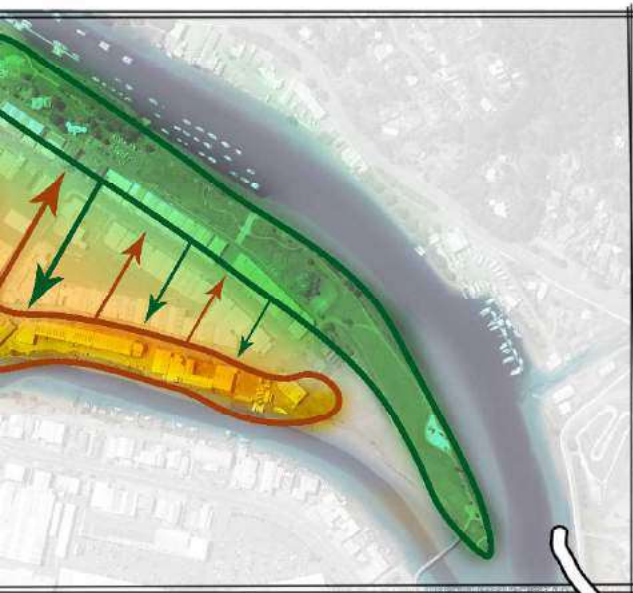
Lead to Water



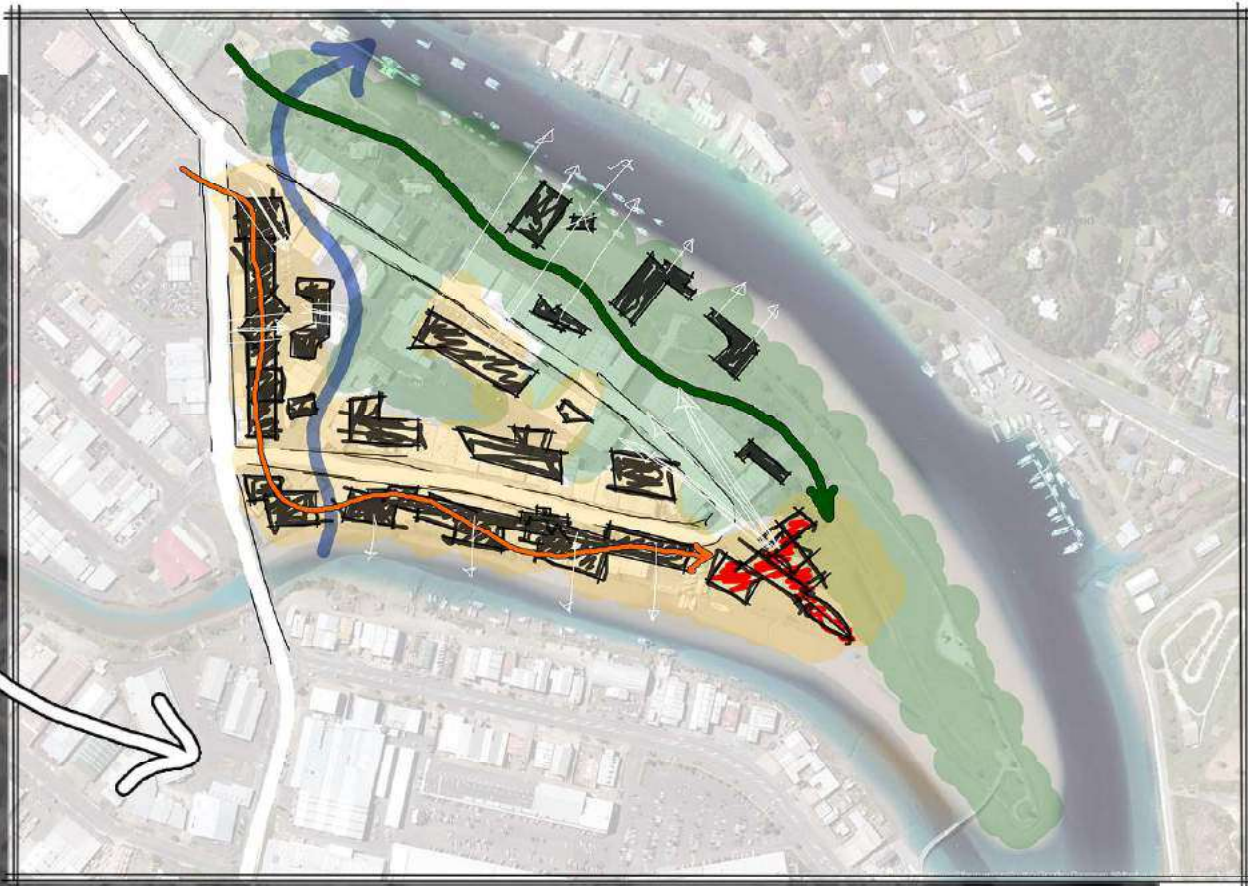
LIVING EDGE VS URBAN

THE URBANISM IS...
 THE GREEN CORRIDOR...
 THE SPACE BETWEEN...
 PROGRAM AND OTHER...



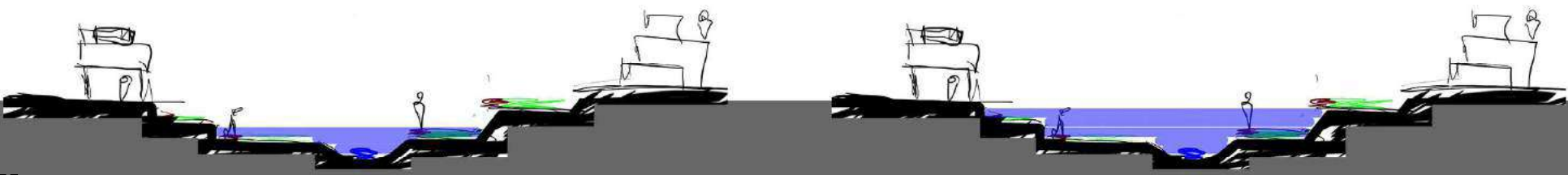


URBAN EDGE
 MOVED TO THE SOUTH.
 POR IS KEPT TO THE NORTH.
 EN CREATES THE RESIDENTIAL
 HER TE ARANGA OPPORTUNITIES.



URBAN DISTRIBUTION DIAGRAM

THE TWO EDGE APPROACH ALLOWED THE DESIGN TO GROW IN A NATURAL WAY WHILE STILL ALLOWING THE CORRIDOR WITH THE CDB. BY RE-ESTABLISHING THE STREAM IT CREATES ANOTHER LEVEL TO WORK WITH AN THE OPPURTUNITY FOR RIPARIAN EDGES AND EDUCATION THROUGH THE SITE ITSELF.



DESIGN INSPIRATION



'BAO'HAN G107 CORRIDOR REGENERATION MASTERPLAN', SHENZHEN, CHINA, 2016, BY MLA+



'SAINT LOUIS, MISSOURI'.

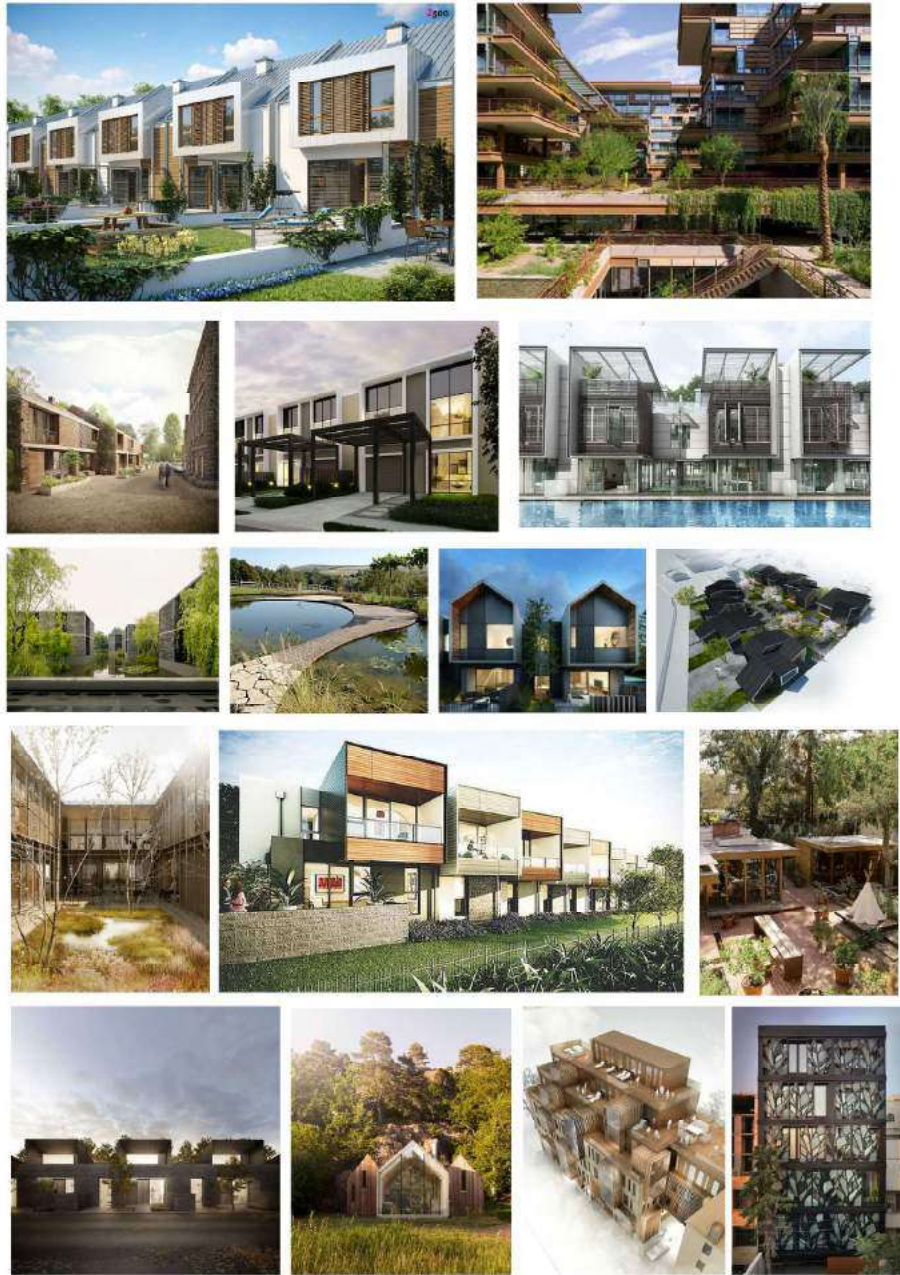


'EDINBURGH GARDENS RAINGARDEN', 2010, BY GHD, AUSTRALIA



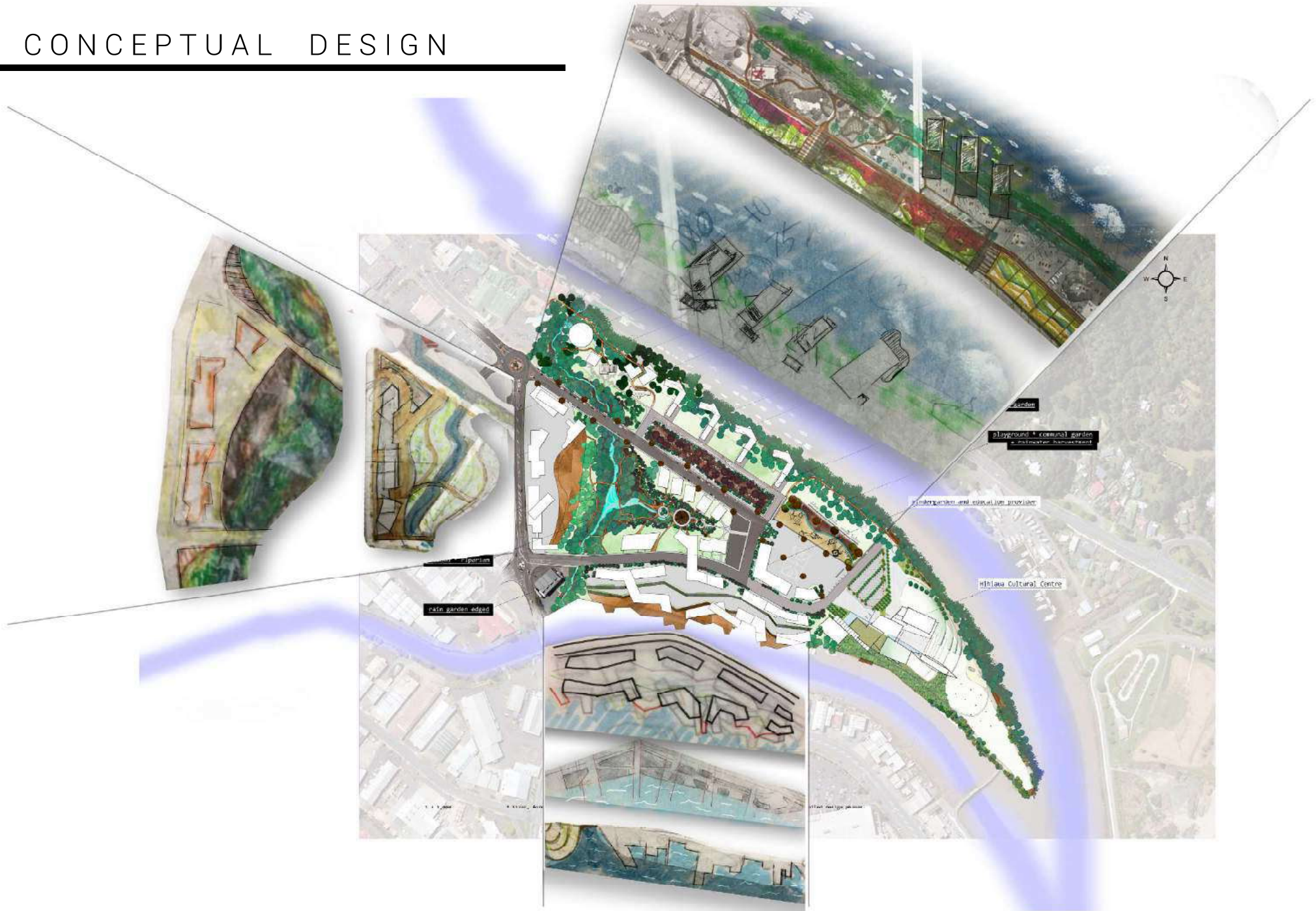
PINTEREST, 'HIHIAUA BOARD', 2017





PINTEREST, 'HIHIAUA BOARD', 2017

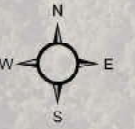
CONCEPTUAL DESIGN



DEVELOPED DESIGN







AQUATIC THEATRE

DEPOT AND GATHERING PLACE FOR CLEANERS AND GARDENERS

REYBURN HOUSE

CAFE AND RESTAURANT

RIPARIAN VEGETATION @ 12-25M WIDTH

RESIDENTIAL 4 HOUSINGS PER BLOCK

BOTANICAL RAIN GARDEN

PLAYGROUND + COMMUNAL GARDEN
+ RAINWATER HARVESTMENT

KINDERGARTEN AND EDUCATION PROVIDER

HIHIAUA CULTURAL CENTRE

VISITOR CENTRE

PUBLIC CAR PARK

MEDICAL CENTRES, POST OFFICE,
AND OTHER RETAIL

WETLAND + RIPARIAN

RAIN GARDEN EDGED

MASTERPLAN DESIGN



FLOODING: STAGE 1



FLOODING: STAGE 1

MASTERPLAN DESIGN:

LAND USES

-  PEDESTRIAN WALKWAYS
- USUALLY EXISTING
-  SHARED PATHWAY FOR BOTH
PEDESTRIAN & VEHICLE -
SLOW ZONE 20KM/H
-  VEHICLE CARRIAGEWAY -
50KM/H ZONE
-  GRASS / OPEN SPACE
-  PLAYGROUND
-  DECK / BOARDWALK



POTENTIAL LAND COVER MATERIALS

-  CONCRETE RECYCLED FROM DEMOLISHED
AND DEPAVED EXISTING CONCRETE-BUILT
SURFACES
-  TRAFFIC CALMING TEXTURED PAVEMENT
-  EXISTING / CONCRETE AGGREGATE
-  GRASS
-  SAND OR BARK MULCH
-  TIMBER RECYCLED FROM DEMOLISHED
WOODEN HOUSING

reference

traffic calming
<http://diyturnpikelane.files.wordpress.com/2011/06/blockworkbg.jpg>

OUR DESIGN CONCEPT

The Hihiaua Peninsula project was an opportunity to show the community of Whangarei how a waterfront development can respond to climate change in the coming years. We met with the community to listen to their specific requirements. Due to the cultural significance of the site and its community driven development these design considerations were as important as climate change to the site.

One key quote that stood out to our group and heavily influenced our design was:

The Hihiaua site should be "a place for the world to recognise climate changes impact on cities"

We used this to influence the design as well as tried to create a site which can act as a tool for teaching the community how a site can respond to climate change and the environment in a positive and aesthetic was.

The community also requested we include an affordable housing strategy, a strong connection with the river and the people, and to respect the natural value of the site. They wanted a design that was still a "Village" without fences but could be integrated with the urban environment of the CBD just down the road.

Key words:

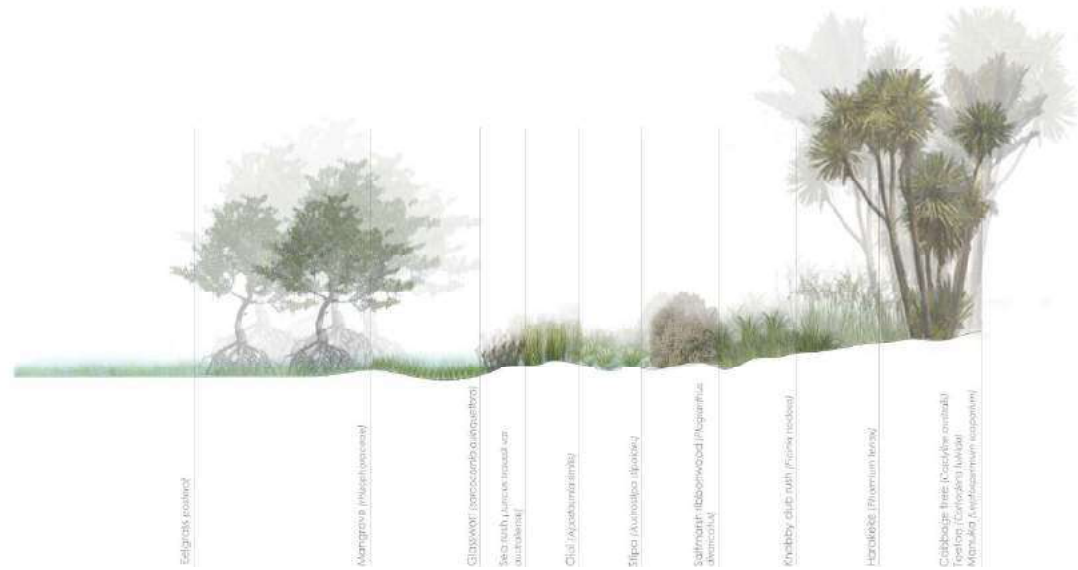
RESPECT | INCLUSION | CULTURE | HISTORY | FUTURE

DESIGN OBJECTIVES

- Re-establish the river
- Create an urban edge
- Create a living/green edge
- Integrate these spaces through communal shared space within residence
- Guide people to the cultural centre through the urban route or the green route
- Keep a corridor with the CBD that leads into the site
- Connectivity between the water and the people
- Long term strategy 20+, 50+, beyond?
- Allowing the site to flood in controlled way
- Water leaves cleaner than it arrived
- Definition between zones without losing connections
- Allows for Live, Work, Play, and Learning
- Have a 85% permeable space

PLANTING LIST

	Common Name	Botanical Name	Spread	Height
Tree	manuka	<i>Leptospermum scoparium</i>	1.5m	4m
	kanuka	<i>Kunzea ericoides</i>	3m	12m
	cabbage tree	<i>Cordyline australis</i>	2m	8m
	nikau	<i>Rhopalostylis baueri</i> var. <i>cheesemaniai</i>	3m	8m
	mangrove	<i>Avicennia marina</i> subsp. <i>australasica</i>	2.5m	3m
	toetoe	<i>Austroderia splendens</i>	1.5m	3m
	mahoe	<i>Melicytus ramiflorus</i>	3m	4m
Sedge	knobby club rush	<i>Ficinia nodosa</i>	0.7m	0.7m
	oioi	<i>Apodasmia similis</i>	1m	1.6m
Shrub	mākaka/ saltmarsh ribbonwood	<i>Plagianthus divaricatus</i>	1.5m	3m
	nikau	<i>Coprosma repens</i>	2m	2m
Flax	mountain flax	<i>Phormium cookianum</i>	1.5m	1.5m
	harakeke	<i>Phormium tenax</i>	3m	3m
Grass	pukio	<i>Carex secta</i>	1.5m	1.5m
	purei	<i>Carex dissita</i>	0.5m	0.5m
	eel grass	<i>Zostera marina</i>		
	stipa	<i>Austrostipa stipoides</i>	0.75m	0.5m
Rush	sea rush	<i>Juncus kraussii</i> var. <i>australiensis</i>	1m	1m
	glasswort	<i>Sarcocornia quinqueflora</i>	0.9m	0.1m
Other	taro	<i>Colocasia esculenta</i>	1.1m	1m
	kawakawa	<i>Macropiper excelsum</i>	3m	3m
	watercress	<i>Nasturtium officinale</i>	0.3m	0.3m
	puha		0.3m	0.2m



WETLAND & RIPARIAN

Oioi (*Apodasmia similis*)
 Sea rush (*Juncus kraussii* var. *australiensis*)
 Harakeke (*Phormium tenax*)
 Mountain flax (*Phormium cookianum*)
 Glasswort (*Sarcocornia quinqueflora*)
 Stipa (*Austrostipa stipoides*)
 Eel grass (*Zostera marina*)
 Taupata (*Coprosma repens*)
 Mākaka/ saltmarsh ribbonwood (*Plagianthus divaricatus*)

Knobby clubrush (*Ficinia nodosa*)
 Manuka (*Leptospermum scoparium*)
 Kanuka (*Kunzea ericoides*)
 Cabbage tree (*Cordyline australis*)
 Nikau (*Rhopalostylis baueri* var. *cheesemaniai*)
 Mangrove (*Avicennia marina* subsp. *Australasica*)
 Toetoe (*Austroderia splendens*)
 Mahoe (*Melicytus ramiflorus*)
 Puriri (*Vitex lucens*)

CULTURAL PLANTS & COMMUNAL GARDEN

Kawakawa (*Macropiper excelsum*)
 Manuka (*Leptospermum*)
 Kanuka (*Kunzea ericoides*)
 Watercress (*Nasturtium officinale*)
 Puha (-)
 Taro (*Colocasia esculenta*)

RAIN GARDEN

Pukio (*Carex secta*)
 Purei (*Carex dissita*)
 Oioi (*Apodasmia similis*)
 Taupata (*Coprosma repens*)
 Harakeke (*Phormium tenax*)



MANUKA KANUKA CABBAGE TREE MANGROVE PUKIO PUREI EEL GRASS STIPA TAUPATA MOUNTAIN FLAX HARAKEKE TARO



MAHOE PURIRI GLASSWORT KNOBBY CLUB RUSH SALTMARSH RIBBONWOOD OIOI SEA RUSH TOETOE KAWAKAWA WATERCRESS PUHA NIKAU

Momentum North Group's five themes

-WORK

There is 105 businesses already in Hihiaua, so we have good base to grow and develop. Through our research live work ratio of the Whangarei centre is out of balance and Hihiaua is a way to rebalance this with the work / live scenarios.

-LIVE

The total population of Whangarei district as at 30 June 2016 estimated to be 87,700. But only 0.003% live in the CBD and working age people is increasing. Early childcare / school numbers on the increase in town. The population from Auckland is +30% in last 3 years. So the large proportion of our population increase is people returning home

-PLAY

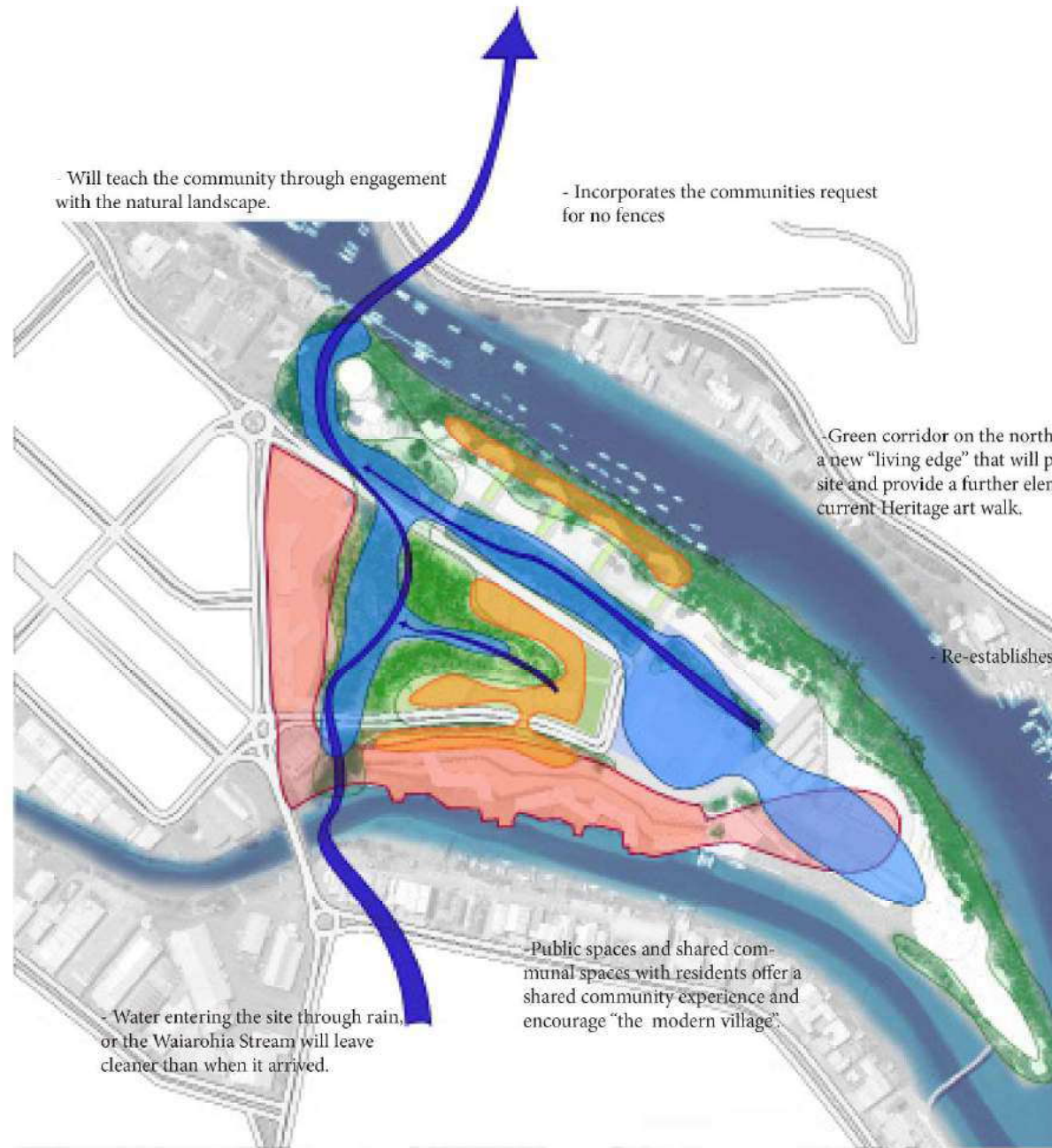
The investment of this area has seen increased. The loop walkway and its complementary attractors in 2015 around 3/4 of users were local and either daily or weekly repeat users. The two rivers are this areas greatest strength.

-LEARN

He Puna Marama Trust with their Kura -Te Kāpehu Whetū (Years 7-13), Leadership Academy of A Company and also the Indigenous Knowledge Centre of Distinction (Pacific Centre) and Whangarei Youth Theatre, dance schools and Thrive tuition also provide learningspaces in the precinct. Also the Loop Walk provides us with stories of our heritage.

-VISIT

There are further tourism projects planned in this area but still need to provide activators for visitors in Hihiaua to extend the time they spend here. 24 hour experience to create more memories.



establishes
protect the
ment to the

ecological corridor through the site



WORK

- 105 businesses already in Hihiaua
- Office space
- Factory
- Workplace learning



LIVE

- Boathouse apartment
- Community housing



PLAY

- Walkway
- Play grand
- Water edge



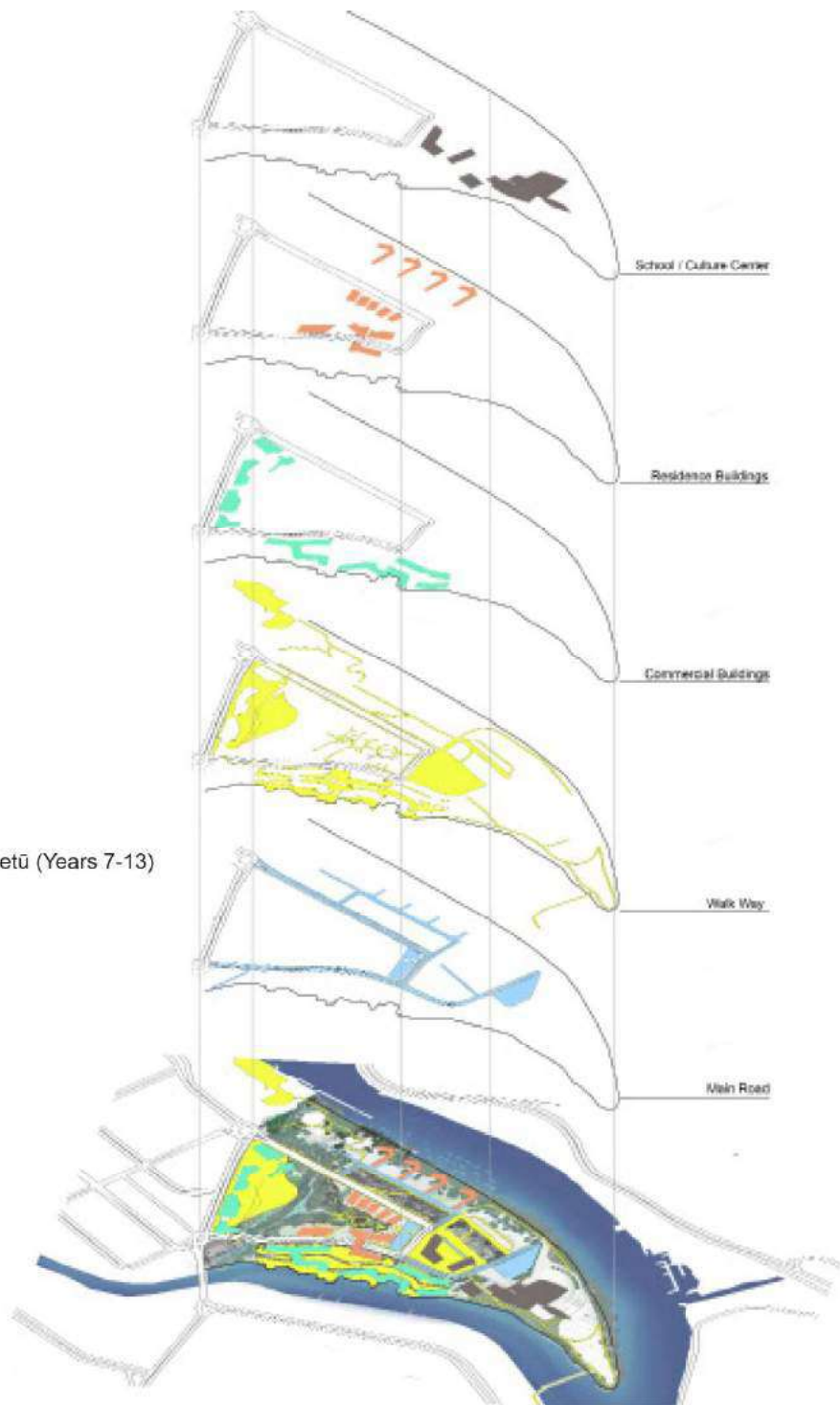
LEARN

- Culture center
- He Puna Marama Trust with their Kura -Te Kāpehu Whetū (Years 7-13)
- Whangarei Youth Theatre
- Hihiaua Cultural centre

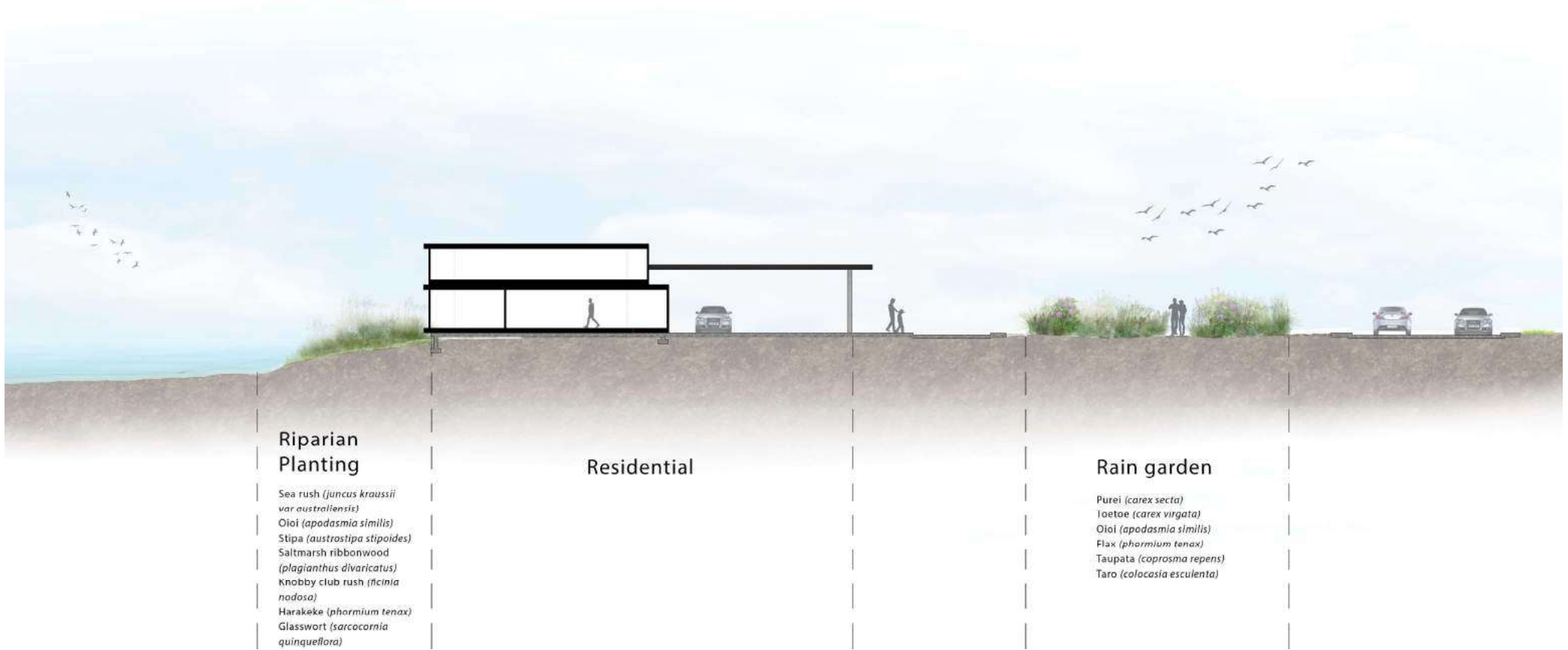


VISIT

- Retail store
- Restaurant
- Boardwalk way
- Water edge



SECTIONS





Section A to A

Retail and communal space

Wetland & Riparian

- Phormium cookianum*
- OiOI*
- Ribbon wood*
- Coprosma*
- Mahoe*
- Muehlenbeckia*
- Sea rush*
- Jointed rush*
- Stipa*
- Knobby club rush*
- Glaucocystis*

RENDERS



COMMERCIAL & RETAIL SPACE



COMMERCIAL & RETAIL SPACE



RESIDENTIAL SPACE



RESIDENTIAL SPACE

HIHIAUA PRECINCT DESIGN



ISSUES ABOUT HIHIAUA

Compensation issues and adaptive reuse of waterfront structures along the waterfront without losing their value

Evolution of public waterfront spaces

Overcrowding

Loss of ecological resources due to land reclamation for urban development

Map of the Hihiaua area showing various zones and features. The map includes a legend with color-coded areas for different zones, a scale bar, and a north arrow. Several circular callouts provide detailed views of specific areas on the map.

MASTER PLAN



ZONING

Western Design Rationale

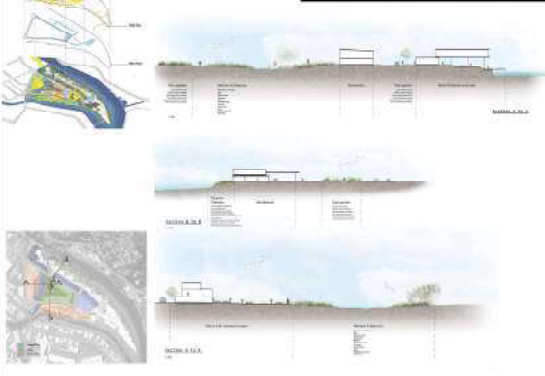
DESIGN RATIONALE

DESIGN RATIONALE

DESIGN RATIONALE

Zoning diagram showing various zones and their boundaries. The diagram uses different colors to represent different zoning categories and includes a legend to explain the color coding.

SECTION



FINAL POSTER DESIGN



REFERENCES

- Acreman, M., & Holden, J. (2013). How Wetlands Affect Floods. *Wetlands*, 33(5), 773-786. doi:10.1007/s13157-013-0473-2
- Auckland Council. (n.d.). Te Aranga Principles - Auckland Design Manual. Retrieved from http://www.aucklanddesignmanual.co.nz/design-thinking/maori-design/te_aranga_principles
- Auckland Regional Council. (n.d.). TP10-Stormwater. Retrieved from <http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/plansstrategies/unitaryplan/Documents/Material%20incorporated%20by%20reference/upmirbcounciltp10stormwater.pdf>
- Amery, M. (2016). Hit the North | The Big Idea. Retrieved from <https://www.thebigidea.nz/stories/hit-the-north>
- Brooklyn Bridge Park. (n.d.). Brooklyn Bridge Park. Retrieved from <http://www.brooklynbridgepark.org/>
- Cilento, K. (2010). Rising Currents at MoMA | ArchDaily. Retrieved from <http://www.archdaily.com/53736/rising-currents-at-moma>
- Orange, C. (2005) , 'Northland places - Whāngārei city and environs', Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/northland-places/page-15>
- Department of Conservation. (n.d.). Natural areas of Whangarei Ecological District: Northland Conservancy Ecological Districts Survey Reports: Land conservation publication. Retrieved from <http://www.doc.govt.nz/about-us/science-publications/conservation-publications/land-and-freshwater/land/northland-conservancy-ecological-districts-survey-reports/natural-areas-of-whangarei-ecological-district/>
- Department of Conservation. (n.d.). Why wetlands are important: Wetlands. Retrieved from <http://www.doc.govt.nz/nature/habitats/wetlands/why-wetlands-are-important/>
- Doyle AF (1987) The Charles River Watershed: a dual approach to floodplain management. Proceedings of the National Wetland Symposium on Wetland Hydrology. Association of State Wetland Managers Inc., Chicago, pp 110–112
- Jenkin, L. E., Brown, M. E., & Watkins, D. C. (n.d.). Red river valley wetland enhancement project cornwall. Retrieved from http://hydrologie.org/ACT/CIC/CIC_2_347.pdf
- Johnson, Alexa, (2002). The art of matchmaking. *Te Ara - Journal of Museums Aotearoa*, 27(2), pp. 8-10.
- Landcare research. (n.d.). A home rain garden | Rain Gardens | Landcare Research. Retrieved from <http://www.landcareresearch.co.nz/science/living/cities,-settlements-and-communities/urban-stormwater-management/bioretenion-devices/raingardens/a-home-raingarden>
- Moller Architects. (n.d.). Moller Architects, architect, Auckland, New Zealand. Retrieved from <http://www.mollerarchitects.com/hihiaua-cultural-centre>
- Myers, S. (2014). Opportunities for Promoting Ecological and throughout the Waterfront. Retrieved from <http://www.wynyard-quarter.co.nz/wqsmart/www/pdfs/environmental/smyers-biodiversity-opportunities-for-wynyard-quarter-11-feb-2014.pdf>
- Northland Regional Council. (2012). State of the Environment Report. Retrieved from <http://resources.nrc.govt.nz/upload/12751/Our%20coast%20-%20SOE%202012.pdf>
<http://whangareinz.com/destinations/whangarei-city/wdc-20-20-momentum-27-july-2016-without-minutes.pdf>
- Panuka Development Auckland. (n.d.). Panuku Development Auckland | Shaping spaces for Aucklanders. Retrieved from <https://www.panuku.co.nz/>
- Poehan, Scott. (2007). 'Cursive Line – Adele Youngusband'. Whangarei: WAM publications.
- Prentice, I. (2015). Hihiaua Precinct Plan. Retrieved from <https://hihiaua.files.wordpress.com/2016/12/hihiaua-precinct-plan.pdf>
- Ramsar. (n.d.). Wetland ecosystem services. Retrieved from http://www.ramsar.org/sites/default/files/documents/library/services_01_e.pdf
- Waterfront Auckland. (2013). Sustainable development framework. Retrieved from <http://wynyard-quarter.co.nz/www/uploads/widgets/files/sustainable-dev-framework-8c78bcfb5.pdf>
- Webster, M. (n.d.). Thatch | Definition of Thatch by Merriam-Webster. Retrieved from <https://www.merriam-webster.com/dictionary/thatch>
- Whangarei District Council. (2009). Parihaka and Hatea River Reserves Management Plan. Retrieved from <http://www.wdc.govt.nz/FacilitiesandRecreation/ReservesandOpenSpaces/ReserveManagementPlans/Documents/Parihaka-and-Hatea-River-Reserves-Management-Plan.pdf>
- Whangarei: Love it here. (n.d.). Mount Manaia :: Land Activities - WhangareiNZ.com. Retrieved from <http://whangareinz.com/activities/detail/mount-manaia-whangarei-heads>

Images

- Wilkes, J. (n.d.). Red River. Retrieved from <http://cornwallmaps.org/cms/camborne/things-to-do-in-camborne/historical-trails/red-river-valley-walk/#imageclose-2668>
- Albert, S. (n.d.). Watercress. Retrieved from http://www.harvesttotable.com/2009/04/how_to_grow_cress/
- Ashford, P. (n.d.). Harakeke. Retrieved from http://www.nzplantpics.com/sfeature_galleries/phormium/phormium_tenax.htm
- Bendle, P. (n.d.). Coprosma repens. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/table-1/coprosma-taupata-coprosma-repens.html>
- Bendle, P. (n.d.). Manuka. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/trees-native-botanical-names-g-to-l/manuka.html>
- Bendle, P. (n.d.). Kanuka. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/trees-native-botanical-names-g-to-l/kanuka.html>
- Bendle, P. (n.d.). Mahoe. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/trees-native-botanical-names-m-to-q/mahoe.html>
- Bendle, P. (n.d.). Kawakawa. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/trees-native-botanical-names-m-to-q/kawakawa.html>
- Bendle, P. (n.d.). Mountain flax. Retrieved from <http://www.terrain.net.nz/friends-of-te-henui-group/plants-native-botanical-names-m-to-q/flax-mountain-phormium-cookianum.html>
- Bulmer, A. (2016). Mangrove. Retrieved from <http://www.alicebulmer.com/mangroves-foreshore-forests/>
- Climate Garden. (2008). Toetoe. Retrieved from <http://www.myclimatechangegarden.com/blog/toe-toe-nz-pampas-grass>
- Coast Palms & Cycads. (n.d.). Nikau. Retrieved from <http://www.coastpalms.co.nz/catalogue/kermadec-nikau>
- Conservation. (n.d.). Eelgrass. Retrieved from <https://www.conservationgateway.org/ConservationPractices/Marine/HabitatProtectionandRestoration/Pages/Southern-New-England-and-New-York-Sea-grass-Research-Initiative.aspx>
- Dan, C. (2010). Saltmarsh ribbonwood. Retrieved from <http://www.christinedann.org/2010/10/the-endemic-and-pongy-saltmarsh-ribbonwood/>
- Ford, K. (2015). Oioi. Retrieved from <http://www.nzflora.info/factsheet/taxon/Apodasmia-similis.html>
- Kings Plant Barn. (n.d.). Puha. Retrieved from <https://www.kings.co.nz/gardening-news/eating-weeds>
- Lower Eyre Pest Management Group. (n.d.). knobby club rush. Retrieved from <http://www.pestandweeds.com/weed-profiles/weed-herbs/onion-weed/>
- NZ Seeds. (n.d.). Carex secta. Retrieved from <http://www.nzseeds.co.nz/shop/Carex-secta>
- Stipa. (2011). Retrieved from https://commons.wikimedia.org/wiki/File:Stipa_tenuifolia_02_by_Line1.jpg
- Suemcgaw. (2014). Sea rush. Retrieved from <https://www.inaturalist.org/observations/982957>
- Sullivan, J. (n.d.). Cabbage tree. Retrieved from http://www.canterburynature.org/species/lincoln_essays/cabbagetree.php
- The Rural. (2013). Taro. Retrieved from <http://www.therural.co.nz/livestock/poisonous-plants-taro>
- Wiggenraad, V. (n.d.). Glasswort. Retrieved from http://www.enviroactive.com.au/media?type=photo&field_section_tid=All&field_category_tid=All&field_location_taken_tid_1=All&field_taxonomy_tid=382&field_region_tid=All&=Apply

American Society of Landscape Architects. (2008). General Design Honor Award: Gannett/USA Today Headquarters, McLean, Virginia. Retrieved from <https://www.asla.org/awards/2008/08winners/415.html>
Green Water Infrastructure. (2011, January 10). Rain Gardens & Bioswales Presentation from the National Green Centre: National Green Centre Presentation: Saint Louis, Missouri [Web log post]. Retrieved from <http://thinkgwi.com/2011/01/12/rain-gardens-bioswales-presentation/>

Hitchcock, D. (2015). Maori Forts – Pa: Turuturu Mokai Pā. Retrieved from <http://www.donsmaps.com/maoripa.html>

Landezine. (2010). Edinburgh Gardens Raingarden. Retrieved from <http://www.landezine.com/index.php/2012/10/edinburgh-gardens-raingarden-by-ghd-pty-ltd/>
MLA+. (2017). Bao'An G107 Corridor Regeneration Masterplan. Retrieved from <http://www.mlaplus.com/portfolio/en-22-2-33/>

Pinterest, Hihiaua Board, <https://nz.pinterest.com/sarahashleigh12/>, accessed 12.04.2017

Whangarei District Historic Heritage Report, <http://www.wdc.govt.nz/PlansPoliciesandBylaws/Plans/SustainableFutures/Documents/Sustainable%20Society%20and%20Culture/Heritage-Report.pdf>